

A NEW SPECIES OF GERBIL FROM SOUTH WEST AFRICA
WITH REMARKS ON *GERBILLUS TYTONIS* BAUER AND NIETHAMMER, 1959
(RODENTIA: GERBILLINAE)

DUANE A. SCHLITZER¹

ABSTRACT: A new species of *Gerbillus* (*Gerbillurus*) is described from Gobabeb, South West Africa. This new species exhibits the maximum cranial size and bullar hypertrophy known for the subgenus. The skins of *Gerbillus tytonis* are described for the first time. *Gerbillus tytonis* was known previously only by cranial elements taken from owl pellets.

The Smithsonian Institution's African Mammal Project had field parties collect small mammals and their ectoparasites in southern Africa from 1963 until 1969. Among the specimens collected were numerous *Gerbillus*. In southern Africa, this genus is presently in a confusing taxonomic state. There appear to be two groups of nominal species in the genus *Gerbillus* in southern Africa: a "paeba" group including the names listed under *Gerbillus paeba* by Roberts (1951) and subsequent authors and a "vallinus" group including *Gerbillus vallinus* Thomas, 1918, and *Gerbillus tytonis* Bauer and Niethammer, 1959. These species have been included under the subgenus *Gerbillurus* Shortridge, 1942.

Shortridge (1942:52) proposed the name *Gerbillurus* as a subgenus of *Gerbillus* to include only the species *vallinus*. In the original description, *Gerbillurus* was characterized as having a long and relatively tufted tail, which in some examples is half as long again as the head and body, partially bare soles, and a triangular skull with inflated bullae. Although elevated to generic rank by Roberts, 1951, and Lundholm, 1955, *Gerbillurus* was retained as a subgenus of *Gerbillus* by Ellerman, Morrison-Scott, and Hayman, 1953, and the species *vallinus* was included in the genus *Gerbillus* by Meester, Davis, and Coetzee, 1964. Herold and Niethammer (1963:54, 56) concluded that *Gerbillurus* was more closely related to *Tatera* after comparisons of the enamel patterns of the lower first molars of young animals and the molar alveoli of different genera of gerbillines. They did not state conclusively, however, whether *Gerbillurus* should be recognized as a distinct genus or remain as a subgenus of *Gerbillus*.

A review of the taxonomic status of *Gerbillurus* Shortridge, 1942, and the species in both the "paeba" and the "vallinus" groups is underway.

However, this preliminary paper was completed so that the new name would be available.

A new species is being proposed in the "vallinus" group and the skins of *Gerbillus* (*Gerbillurus*) *tytonis* Bauer and Niethammer, 1959, are described for the first time.

METHODS

All measurements were taken with dial calipers and are in millimeters, weights are in grams and capitalized color terms are from Ridgway "Color Standards and Color Nomenclature" 1912. Hind foot measurements of specimens in the Smithsonian Institution include toenail. Total length and length of tail were taken on dorsal surface of specimens; the latter measurement with tail held perpendicular to body. Breadth of auditory bulla is the distance from the outside edge of the auditory meatus to the inner edge of the bulla. All specimens are deposited in the National Museum of Natural History, Smithsonian Institution (USNM), unless otherwise indicated. Specimens from the Transvaal Museum (TM), Pretoria; British Museum (Natural History) (BM), London; and the American Museum of Natural History (AMNH), New York, were also examined. The new species may be known as:

Gerbillus (*Gerbillurus*) *setzeri*, new species

Figure 1

Holotype:—Young adult female, skin and skull, United States National Museum of Natural History

¹ African Mammal Project, Smithsonian Institution, Washington, D.C. 20560 and Dept. Zoology, University of Maryland, College Park 20742.

no. 342253, from 1 mi E Namib Desert Research Station, Gobabeb, South West Africa; obtained 22 November 1963 by A. C. Risser, original no. 359.

Specimens examined.—Seventy-four, as follows: South West Africa: 1 mi E Namib Desert Research Station, Gobabeb, 23; 8 mi E Namib Desert Research Station, Gobabeb, 1; Namib Desert Research Station, Gobabeb, 10 (1 TM); Swartbank [= Zwartbank] Mountain, 36 km WNW Gobabeb, 22; Tumas Mountain, 1; near Swakopmund, 2 (AMNH); Goanikontes, 3 (AMNH); 10 km E Hope Mine, 1 (TM); east of Gobabeb, 1 (TM); 8 mi E Hope Mine, 3 (TM); east of Hope Mine, 2 (TM); Swakopmund, 5 (TM).

GAZETTEER

Goanikontes	22° 40' S, 14° 50' E
Gobabeb	23° 34' S, 15° 03' E
Hope Mine	23° 34' S, 15° 15' E
Sossus Vlei	24° 44' S, 15° 18' E
Zwartbank Mtn.	23° 22' S, 14° 58' E
Swakopmund	22° 41' S, 14° 32' E
Tumas Mtn.	23° 29' S, 15° 31' E

Measurements.—Selected external and cranial measurements of the holotype are: Total length, 249; length of tail, 143; length of hind foot, 32; length of ear from notch, 15; occipitonasal length, 32.6; greatest breadth across zygomatic arches, 17.1; greatest breadth of braincase, 15.1; height of skull, 13.5; least interorbital breadth, 5.3; length of nasals, 12.8; oblique length of audital portion of auditory bulla, 11.8; crown length of maxillary toothrow, 4.5; greatest breadth of M^3 - M^3 , 5.1; length of anterior palatine foramina, 5.7; and length of posterior palatine foramina, 25. Comparative measurements of three species of *Gerbillus* (*Gerbillurus*) are given in table 1.

Diagnosis.—Upper parts near Light Pinkish Cinnamon, with slight admixture of gray hairs; all hairs plumbeous at base. Circumoral, entire underparts, supraorbital and postauricular spots, and dorsal surfaces of hands and feet, white; all hairs uniformly white to base. Sharp line of demarcation present between dorsal and ventral colors of body. Tail relatively short for subgenus and bicolored, dorsal color same as color of back, ventral color white; tail with penicillate tip of Mouse Gray dorsal hairs on distal one-third. Color of back extending to hairs on external surface of pinna; hairs of internal face of pinna white; flesh of pinna Cinnamon-Buff. Skull large for subgenus; upper toothrow relatively short and robust; audital and mastoidal portions of auditory bulla relatively large and well inflated ventrally and posteriorly; mastoidal portion of auditory bulla projecting beyond occiput; external auditory meatus well inflated anteriorly and foramen of Huschke well developed ventrally; anterior palatine foramina relatively short and wide; posterior palatine foramina long.

Comparisons.—From the nominal species of

the *Gerbillus paeba* group in southern Africa, *Gerbillus* (*Gerbillurus*) *setzeri* can be distinguished by its larger size, both externally and cranially. The large size of the body and the hind feet serve at once to distinguish this new species from any of the smaller *G. paeba*.

From *Gerbillus* (*Gerbillurus*) *vallinus vallinus* as known from the vicinity of Berseba, South West Africa, and Tuin, South Africa, this new species differs externally by having a shorter tail, longer hind feet, smaller ears and being dorsally paler in color. Cranially, the skull of *G. setzeri* is longer and broader, the bulla larger and more inflated, the breadth across M^3 - M^3 narrower, and the least interorbital breadth narrower than *G. v. vallinus*.

Gerbillus setzeri differs from representatives of *G. vallinus seeheimi* from Seeheim, South West Africa, and numerous localities in the northern Cape Province, South Africa, by the lack of black hairs that are suffused in the dorsal pelage and make up the tufted tip of the tail in *G. v. seeheimi*. Skulls of *G. setzeri* differ from *G. v. seeheimi* in the same manner as from the nominate subspecies. Even though the breadth across M^3 - M^3 is less in *G. v. seeheimi* [5.1 (4.7-5.4) 25] than in *G. v. vallinus* [6.3 (6.1-6.5) 7], this distance is still greater than the same measurement in *G. setzeri* (Table 1).

Representatives of *Gerbillus tytonis* taken at the type locality of *G. setzeri* can be distinguished by the smaller size of the body, shorter and narrower skull, less inflated auditory bulla, and markedly shorter posterior palatine foramina. The dorsal pelage of *G. tytonis* is darker in color than that of *G. setzeri*; the former is a reddish gold color and matches the red sand of the desert south of the Kuiseb River at Gobabeb whereas the latter is a paler color near Light Pinkish Cinnamon and more nearly matches the pale feldspar and quartz plains north and east of the Kuiseb River at Gobabeb.

Statistical Analysis.—Initially, samples of males and females of each of the three species were compared to determine if any secondary sexual variation existed in mensural data. Weights were not included in these tests. These analyses revealed the absence of secondary sexual variation in all of the measurements tested in each of the three species; consequently the sexes were combined for subsequent tests of significant differences between the species. In addition, comparisons between *Gerbillus vallinus vallinus* and *G. v. seeheimi* revealed these two subspecies were sig-

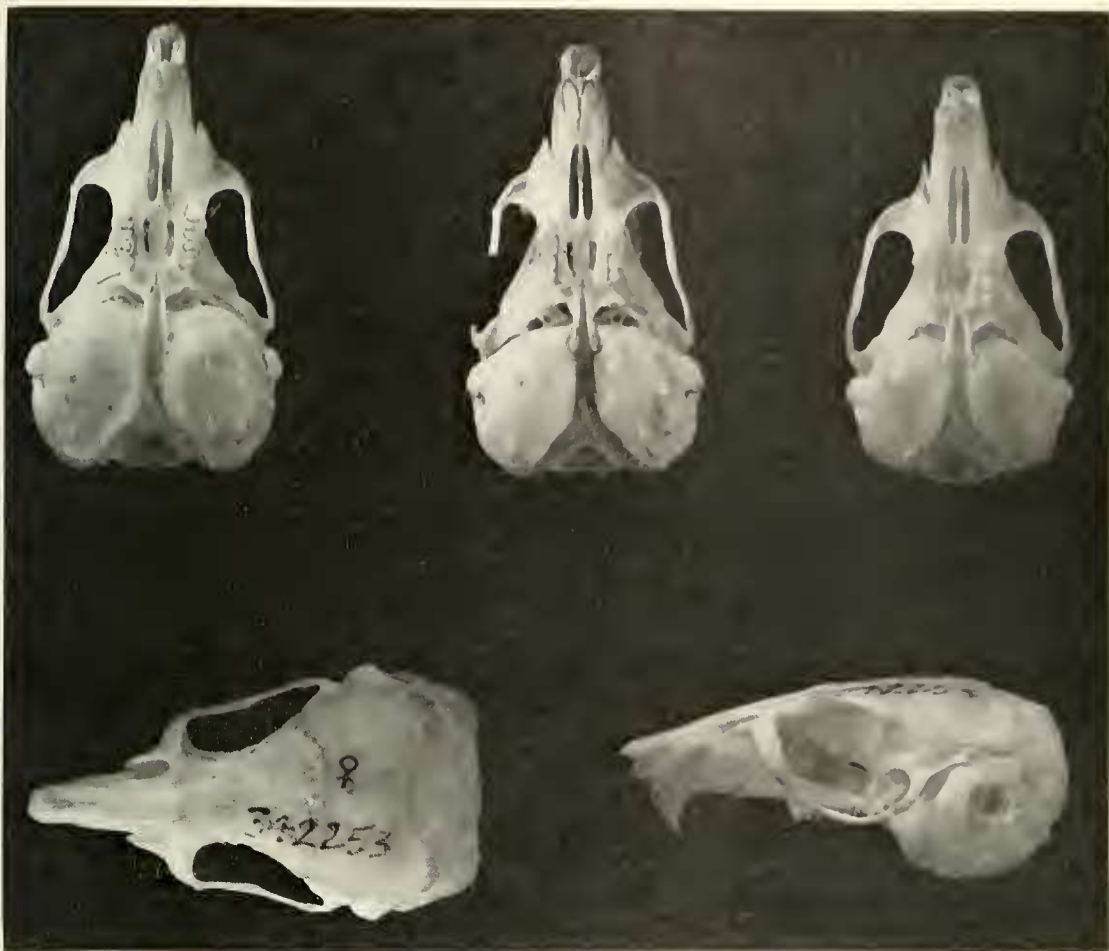


Figure 1. Skulls of the three species of the *Gerbillus vallinus* group. Top row, ventral views from left to right: *Gerbillus setzeri* holotype (USNM 342253); *G. vallinus vallinus*, Berseba, South West Africa (USNM 304852); and *G. tytonis*, Namib Desert Research Station, Gobabeb, South West Africa (USNM 342196). Bottom row, left to right: dorsal view of holotype of *G. setzeri* and lateral view of same skull. (Scale 2 \times)

nificantly different only in the breadth across the third upper molars.

Results of statistical comparisons between samples of *Gerbillus setzeri* with samples of *G. vallinus* and *G. tytonis* are given in table 1. Both "t" tests and "F" tests were computed but SS-STP tests were not run inasmuch as only grouped single samples for each species were available. For all but one measurement, the coefficient of variation was within the range considered normal for small mammals. In the case of the posterior palatine foramina, the high values of the coefficient of variation are a result of the difficulty of taking the measurement. Use of an ocular micrometer or a craniometer would undoubtedly

result in lower coefficient of variation values. The high value of the coefficient of variation for the breadth across third upper molars of *G. vallinus* is a result of combining the samples of the two subspecies.

Two of the results of the "F" test are questionably significant. In the comparison of length of ear between *Gerbillus setzeri* and *G. vallinus*, the "F" test would indicate the variances of the two samples are significantly different at the 95 percent level but the low "t" value (3.189) indicates a questionable difference. In the case of the comparison of crown length of maxillary toothrow between *G. setzeri* and *G. tytonis*, the low "t" value (2.981) again indicates a questionable dif-

TABLE 1. Variation between samples of *Gerbillus setzeri*, *G. vallonius*, and *G. tytonis* from southern Africa. The first line for each measurement includes the mean plus and minus two standard errors, the second line the coefficient of variation and the number of specimens in the sample. Measurements are indicated in which differences between the samples of *G. setzeri* and those of *G. vallonius* and *G. tytonis* are significant (for "t" test, * = 0.05 level of confidence and ** = 0.01 level of confidence; for "F" test, + = 0.05 level of confidence and ++ = 0.01 level of confidence). Abbreviations of measurements are as follows: TL, total length; TA, length of tail; HT, length of hind foot; EN, length of ear from notch; OCN, occipitonasal length; BZA, breadth across zygomatic arches; GBB, greatest breadth of braincase; LIB, least interorbital breadth; GBR, breadth of rostrum; GLN, greatest length of nasals; LAB, oblique length of audital portion of auditory bulla; CLT, crown length of maxillary toothrow; BPM, breadth of palate at M³; LPP, length of anterior palatine foramina; PPF, length of posterior palatine foramina; GHS, greatest height of skull; and GBW, breadth of auditory bulla.

	<i>G. setzeri</i>	<i>G. vallonius</i>	<i>G. tytonis</i>	<i>G. setzeri</i>	<i>G. vallonius</i>	<i>G. tytonis</i>
TL	233.02 ± 2.836 (217-263) 4.13 43	239.85 ± 4.540* (215-266) 4.83 26	225.71 ± 2.260** (205-240) 3.71 55	GLN 12.29 ± 0.172 (11.4-13.1) 3.76 29	11.34 ± 0.184** (10.3-12.4) 4.73 34	11.62 ± 0.161** (10.5-13.0) 5.12 55
TA	127.35 ± 1.979 (113-145) 5.09 43	138.85 ± 3.871** (119-156) 7.11 26	126.49 ± 1.698 (113-141) 4.98 55	LAB 11.39 ± 0.116 (10.6-12.4) 3.01 35	10.62 ± 0.091** (9.9-11.0) 2.50 34	9.80 ± 0.068**+ (9.3-10.4) 2.36 47
HT	32.45 ± 0.365 (30-35) 3.73 44	31.19 ± 0.414** (30-34) 3.45 27	33.37 ± 0.377** (28-36) 4.26 57	CLT 4.33 ± 0.075 (4.1-4.6) 3.77 19	4.08 ± 0.072** (3.7-4.5) 5.08 33	4.23 ± 0.033**+ (4.0-4.5) 2.78 50
EN	13.86 ± 0.254 (12-16) 6.01 43	14.44 ± 0.222**+ (14-16) 4.00 27	12.96 ± 0.180** (12-14) 5.25 57	BPM 5.07 ± 0.055 (4.9-5.3) 2.47 7	5.37 ± 0.189 (4.7-6.5) 9.97 32	4.87 ± 0.065* (4.5-5.3) 4.11 38
OCN	31.43 ± 0.331 (29.5-32.6) 2.52 23	29.90 ± 0.283** (28.2-31.9) 2.64 31	29.34 ± 0.253** (28.1-30.4) 2.82 43	LPP 5.47 ± 0.085 (5.0-6.1) 4.55 34	5.19 ± 0.078** (4.7-5.7) 4.41 34	5.43 ± 0.070 (5.1-6.3) 4.85 56
BZA	16.62 ± 0.153 (15.7-17.4) 2.48 29	15.68 ± 0.155** (15.1-16.8) 2.80 32	15.61 ± 0.183** (14.2-16.6) 3.65 39	PPF 2.32 ± 0.067 (1.8-2.7) 8.73 36	1.98 ± 0.078** (1.4-2.5) 11.45 34	1.08 ± 0.057** (0.6-1.6) 19.87 57
GBB	14.92 ± 0.149 (14.1-16.1) 2.78 31	14.22 ± 0.158** (13.0-15.0) 2.99 29	13.94 ± 0.089**+ (13.4-14.6) 2.10 43	GHS 13.20 ± 0.118 (12.7-13.8) 2.10 22	12.68 ± 0.137** (11.9-13.2) 2.70 25	12.44 ± 0.090** (12.0-12.8) 1.94 29
LIB	5.56 ± 0.053 (5.3-5.9) 2.83 35	5.75 ± 0.076 (5.4-6.3) 3.86 34	5.51 ± 0.048 (5.2-6.0) 3.29 57	GBW 9.04 ± 0.111 (8.1-9.7) 3.63 35	8.61 ± 0.082**+ (8.0-9.0) 2.78 34	8.34 ± 0.060**+++ (7.9-8.9) 2.53 49
GBR	4.07 ± 0.054 (3.6-4.3) 3.80 33	3.94 ± 0.075** (3.5-4.2) 5.46 33	4.11 ± 0.044 (3.7-4.5) 4.04 56			

ference between the variances of the two samples. In all other instances where the "F" test is significant, "t" values are high (6.181–25.003).

Remarks.—*Gerbillus setzeri* is apparently restricted to the very pale feldspar and quartz gravel plains in the Namib Desert. In sharp contrast to this distribution is that of *Gerbillus tytonis*, a species apparently found only on the shifting red sands south of the Kuiseb River. In November of 1963, field collectors for the Smithsonian Institution took both species at Gobabeb in the red sands of the dry river bed and adjacent dunes south and west of the research station. At this time both species were rather common in the vicinity of the field station. According to the late Charles Koch (pers. comm., 1969) in March of 1963, unusually heavy rains fell in the vicinity of Gobabeb and the area to the west with subsequent heavy flooding in the Kuiseb River. In the months following these rains, vegetative growth on the gravel plains was exceptionally lush according to Dr. Koch. Judging from the ages of the specimens taken by the field collectors, by November a good breeding season had been experienced inasmuch as mostly juveniles, subadults and young adults were trapped. No old adults were included in either of the samples of *G. setzeri* from Gobabeb or downstream near Zwartbank Mountain, also situated on the bank of the Kuiseb River. During this period of higher population levels, individuals of *Gerbillus setzeri* apparently dispersed from the gravel plain across the river bed and into the adjacent red sand dunes to the south and west of Gobabeb. Extensive trapping at Gobabeb in December 1969 revealed *Gerbillus setzeri* to be found rarely (five specimens in about 400 trap nights) and only on the gravel plain, whereas *Gerbillus tytonis* was common but found only on the red sands. Individuals of the *Gerbillus paeba* group were found ubiquitously distributed and common at Gobabeb in 1969.

The single individual from Tumas Mountain was taken in fine sand with less gravel present; dry grass formed a rather uniform cover in this area. The locality 10 mi E Hope Mine was also visited and proved to be nearly identical to the gravel plains near Gobabeb and Zwartbank Mountain. Meester (1963:245) reported a male specimen shot on the gravel plain east of Gobabeb.

In the only sample of weights available for *G. setzeri*, males averaged heavier than females taken at Zwartbank Mountain. Eight adult males

averaged 39.5 (37.0–42.5); whereas nine adult females averaged 34.3 (29.5–39.0).

Meester (1963:245) reported an individual from east of Gobabeb as *Gerbillus vallinus vallinus*. A skin with broken skull in the Transvaal Museum (TM 12929) was taken east of Gobabeb by the Bernard Carp expedition. This specimen is probably the same one reported by Meester and is referred here to *G. setzeri*.

This new species is named after Dr. Henry W. Setzer in honor of his efforts in African mammalogy and in particular for his interest in the taxonomy of desert rodents.

REMARKS ON *GERBILLUS*
(*GERBILLURUS*) *TYTONIS*
BAUER AND NIETHAMMER, 1959

Originally proposed by Bauer and Niethammer (1959:255) as a subspecies of *Gerbillus vallinus*. *Gerbillus tytonis* was described from a collection of skulls removed from owl pellets collected at Sossus Vlei, South West Africa. Davis (1968:4) regarded *G. tytonis* as worthy of specific status; he distinguished *tytonis* from *vallinus* by the very short posterior palatine foramina and the small bullae of *tytonis*. I concur with this separation of *G. tytonis* from *vallinus*. In spite of the large amount of variation present in the length of the posterior palatine foramina of *G. tytonis*, this measurement is still significantly shorter than that of *G. vallinus*. *Gerbillus tytonis* is the smallest species of the "vallinus" group (Table 1).

To my knowledge, *G. tytonis* is known in the literature only from skulls recovered from owl pellets; a description of the skins of this species based on adult specimens taken on 28 March 1966 at the type locality follows:

Upper parts near Hazel; all hairs plumbeous at base. Entire underparts, small supraorbital and well-defined postauricular spots, and dorsal surfaces of hands and feet, white; all hairs uniformly white to base. Sharp line of demarcation present between dorsal and ventral color of pelage. Tail relatively long for subgenus and bicolored, dorsal color same as color of back, ventral color same as dorsal but with admixture of white hairs; tail with variable penicillate tip of grayish hairs. White circumoral ring absent. Ears essentially bare and Cinnamon-Buff in color; narrow fringe of black pigmentation present on lateral margin of pinnae.

The dark dorsal pelage, long feet, small size of

body and skull, short posterior palatine foramina and small bullae serve to distinguish *Gerbillus tytonis* from *G. vallinus*.

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